



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of:

NAKAMURA, Yasunori, et al.

Group Art Unit: 1713

Serial No.: 10/629,857

Examiner: William K. Cheung

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FOR: POLYPROPYLENE-BASED RESIN COMPOSITION FOR A METALLIZED FILM, FILM USING THE SAME TO BE SUBJECTED TO METALLIZING AND METALLIZED FILM USING THE SAME

DECLARATION UNDER 37 CFR . 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Yasunori Nakamura, a citizen of Japan, and residing at Yokkaichi-shi, Mie, Japan, hereby declare and state the following:

(1) I graduated from the Graduate School of Mechanical Engineering, Kogakuin University of Japan, in March 1990.

(2) I entered Mitsubishi Kasei Kogyo of Japan in April 1990, where I engaged in research and development of materials for polypropylene films. In 2003, I moved to Research & Development Center for Japan Polychem Corporation of Tokyo, Japan, where I became, and continue to be, a senior researcher engaged in the research and development of materials for polypropylene films.

(3) I am a joint inventor of United States Patent Application Serial No. 10/629,857, identified above.

(4) I have read and am familiar with the above-identified patent application as well as the Official Action of June 23, 2005, in the above-identified application.

(5) I have read and am familiar with U.S. Patent No. 5,922,471 to Chatterjee cited in the Official Action of June 23, 2005.

(6) Under my supervision and control, experiments were conducted according to the teachings of the cited patent to Chatterjee and according to the teachings of the above-identified application.

(7) For use in the experiments, commercial propylene-ethylene random copolymers corresponding to those used in U. S. Patent No. 5,922,471 to Chatterjee were selected according to the following criteria:

- (a) The propylene random copolymer used in the Chatterjee patent was considered to be produced using a Ziegler-Natta type catalyst;
- (b) Table I of the Chatterjee patent identifies a propylene-ethylene random copolymer with C₂ content of 3.2 wt.%; and
- (c) Table II of the Chatterjee patent identifies a propylene-ethylene random copolymer with C₂ content of 3.7 wt.%.

(8) Based on the above criteria of (7), the below-enumerated three types of copolymers were selected from commercially available (or formerly commercially available) copolymers of Japan Polychem Corporation, since they substantially correspond to the above two copolymers identified in the Tables of the Chatterjee patent.

- (i) FG3DE (C₂ content: 3.0 wt.%)
- (ii) X1804 (C₂ content: 4.0 wt.%)
- (iii) FX3A (C₂ content: 4.1 wt.%)

In making these selections, it was noted that a copolymer with C₂ content of 3.2 wt.% or 3.7 wt.% was not commercially available. Therefore, the copolymers were selected so as to have C₂ content slightly below 3.2 wt.% or slightly above 3.7 wt.%.

(9) Each of copolymers (i) and (ii) was produced using a Ziegler-Natta type catalyst, and copolymer (iii) was produced using a Ziegler-Natta type catalyst carried on Mg. Copolymer (i) corresponds to the copolymer obtained in PRODUCTION EXAMPLE 4, and copolymer (iii) corresponds to the copolymer obtained in PRODUCTION EXAMPLE 5. Incidentally, copolymer (ii) currently is commercially unavailable, and was prepared for this experiment in the same manner as in PRODUCTION EXAMPLE 4.

(10) A comparison of the properties between the selected copolymers (i) to (iii) and the copolymers used in the Chatterjee patent indicates the C₂ contents of the selected copolymers (i) to (iii) are not exactly the same as the specific C₂ contents of 3.2 wt.% and 3.7 wt.% respectively disclosed in Tables I and II of the Chatterjee patent. In order to

demonstrate that this difference is negligible and the selected copolymers (i) to (iii) can be regarded as having substantially the same properties as those of the Chatterjee patent, films were prepared in substantially the same manner as in the patent using the selected copolymers (i) to (iii), and subjected to property evaluation in accordance with the patent (except for seal strength and clarity as measured in accordance with ASTM D-1876 and ASTM D-1746, respectively, because the Applicant has no measuring device in accordance with these standards).

(11) Specifically, the formulation of the compositions used for producing these films is as follows:

Copolymer:	99.8 wt.%
IRGANOX 1010:	0.04 wt.%
SANDOSTAB P-EPQ:	0.04 wt.%
DHT 4A:	0.02 wt.%
SYLOBLOC 48:	0.10 wt.%

(12) Each composition was pelletized using a 1.18 inch Brabender extruder maintained at a 220°C melt temperature under nitrogen, and with 100 RPM screw speed. The pellets obtained were extruded into a 1 mil thick cast film using a 1.38 inch Brabender extruder maintained at a 220 °C melt temperature, and with a 35 RPM screw speed (see column 4, lines 56 to 61 of the Chatterjee patent). Films of Examples A, D and E were prepared using the selected copolymers (i) to (iii), respectively. For ease of comparison, the films of Examples 4 and 10 of the Chatterjee patent (prepared using the above-mentioned

specific copolymers with C₂ content of 3.2 wt.% and 3.7 wt.%, respectively) are identified as shown as the results of Examples B and C. The type of copolymers, catalysts and C₂ contents for Examples A to E are summarized in the table below.

Example No.	Type of copolymer	Catalyst	C ₂ content (wt.%)
A	Selected copolymer (i)	Ziegler-Natta	3.0
B	Copolymer contained in Table I of Chatterjee	Ziegler-Natta	3.2
C	Copolymer contained in Table II of Chatterjee	Ziegler-Natta	3.7
D	Selected copolymer (ii)	Ziegler-Natta	4.0
E	Selected copolymer (iii)	Ziegler-Natta carried on Mg	4.1

(13) The properties of the films of Examples A to E are shown in Tables A and B below.

Table A

Example No.	COF (Static)	COF (Kinetic)	Haze(%)	Gloss(%)
A	0.39	0.38	1.1	128
B	0.393	0.382	1.0	134.6
C	0.396	0.364	0.9	138.5
D	0.39	0.38	1.0	136
E	0.38	0.37	0.8	139

Coefficient of friction (COF) (Static, Kinetic): by ASTM D-1894

Haze (%): by ASTM D-1003

Gloss (%): by ASTM D-523

Table B

Example No.	Tear strength (gm/mil)		Tensile properties				Dart drop impact strength (in-gr)
			Modulus 1 % Secant (psi)		Elongation at breakage (%)		
	MD	TD	MD	TD	MD	TD	
A	36.6	52.4	134400	125300	735.7	602.8	2385
B	37.8	54.2	112400	111700	737.2	603.6	2496
D	38.9	57.5	108000	100500	742.5	604.0	3625
E	39.8	60.5	111300	110200	748.9	605.5	3554

Tensile properties: by ASTM D-882

Tear strength: by ASTM D-1922

Dart drop impact strength: by ASTM D-3029

As apparent from Tables A and B above, the properties of the films prepared using the selected copolymers (i) to (iii) are substantially the same as those of the films of Examples 4 and 10 of the Chatterjee patent. Therefore, the selected copolymers (i) to (iii) can be regarded as being substantially the same as the copolymers used in the Chatterjee patent.

(14) The properties of the selected copolymers (i) to (iii) themselves and films obtained therefrom were evaluated in accordance with the procedures set forth in the specification of the subject application. The results are shown below in Tables C and D.

Table C

Example No.	MFR _A (g/10 min.)	M _B /MFR _A	Ethylene content (% by mol)	T _p (°C)
A	7.0	2.86	4.4	145.0
D	6.3	3.17	5.9	139.9
E	8.1	2.47	6.0	137.9

Table D

Example No.	Solubles contained at 20 °C or lower (wt.%)	Solubles contained at 40 °C or lower (wt.%)	Weight-average molecular weight of solubles contained at 20 °C or lower	weight-average molecular weight of solubles contained at 40 °C or lower	PI
A	2.10	3.72	2.7×10^4	4.3×10^4	4.0
D	4.26	6.45	2.9×10^4	9.8×10^4	4.3
E	1.35	3.43	5.3×10^4	9.0×10^4	3.8

As apparent from Tables C and D, none of the selected copolymers (i) to (iii) satisfy all of the requirements of copolymer (A) used in the present invention.

(15) Further, substantially the same procedure as in Example 1 of the present application was repeated, except that the selected copolymers (i) to (iii) are used in place of NOVATEC HJ 490 Powder, so that the characteristics of the resultant primary and metallized films were evaluated. The results are shown below in Tables E, F and G. For ease in comparison, the results of Example 1 of the present application are also shown in these Tables.

Table E

Example No.	Processability	Primary film		
		SWR mark	Haze %	Outer appearances
A	○	3.4	○	800
D	○	3.2	○	1100
E	○	2.8	○	900
1	◎	2.5	○	500

Table F

Example No.	Primary film		
	Tensile modulus Mpa	HS temperature °C	Wound condition
A	590	140	H
D	560	136	H
E	580	134	H
1	740	129	○

Table G

Example No.	Metallized film (metallization suitability)				
	Δ G %	Adhesion properties -	Wetting tension dyne/cm	Peel strength g/15 mm	Wound condition
A	50		36	70	H
D	50	H	32	30	H
E	50	H	37	100	H
1	40	○	40	125	○

Tables E, F and G clearly show that the properties of the films prepared using the above-mentioned selected copolymers (i) to (iii) are poor, as compared to those of the

(16) I have concluded from the above experiments that the propylene random copolymers used in the Chatterjee patent is completely different from copolymer (A) used in the present invention, and cannot be used for preparing the composition of the present invention for metallized films.

The undersigned declares that all statements made herein of his own knowledge are true, and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 1001 of Title 18 of the United States Code and that willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed this 13 day of December, 2005.

Yasunori NAKAMURA

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DWH/rab

